more openings; the total area of these openings may be arrived at by the use of the formula given in an earlier chapter of this work, for furnaces having an orifice in the roof for the escape of the waste gases.

If the area of these orifices and the volume of the combustion chamber are correctly proportioned, the combustion pits of the Cowper stove will be completely filled with the burning gases, which will be held in the combustion chamber by reason of the strangulated outlet, until the reaction of combustion is completed. The free space below the dome of the stove will cease to play the part of a combustion chamber, and it will become possible to carry the checkerwork up higher into the dome of the stove.

### IV. HOT-BLAST TEMPERATURE EQUALIZERS

It is not difficult to show that the construction of a rational apparatus for the equalization of hot-blast temperatures is not practicable.

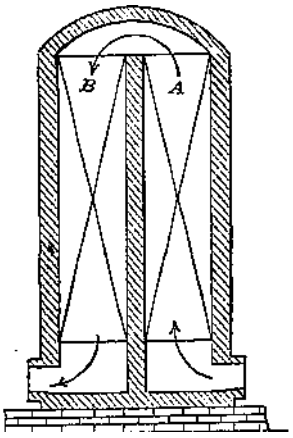


FIG. 75.

Fig. 75 shows the general arrangement of such hot-blast equalizers as have been constructed. Assuming that the temperature of the blast is higher than that of the brickwork in the equalizer, the branch *A,* in which the hot gases rise, will work *irregularly,* whereas the branch *B,* in which the hot gases pass downward, will be heated *uniformly.* The branch *A* will not heat in a satisfactory manner; the branch *B* will heat in a satisfactory manner.

Assuming that the temperature of the hot blast drops below the temperature of the

brickwork, the branch *A* will commence to cool uniformly and rapidly, whereas the branch *B* will cool irregularly and slowly.

No one has been able to obtain satisfactory results from the use of hot-blast temperature equalizers, and for this reason they are very rarely used.